

# Mean field MHD using direct numerical simulations

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## **Abstract**

Mean field Magnetohydrodynamics use averaged versions of the induction and Navier-Stokes equations to model the generation of large-scale flows and magnetic fields in stellar convection zones. Traditionally, analytical models have been used to model the interactions between the small-scale and the large-scale flows and magnetic fields, which appear as extra terms in the averaged equations. With high performance computers, it is possible to derive the transport and magnetic field generation effects of rotating stellar convection from direct numerical simulations. We show results from this approach and their application on solar and stellar activity.